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THANJAVUR

Dissertation on

"STUDY ON PREVALENCE OF SLEEP DISORDERS AMONG UNDERGRADUATE MEDICAL STUDENTS IN TEACHING INSTITUTION"

DISSERTATION SUBMITTED FOR DOCTOR OF MEDICINE

BRANCH – XVIII (PSYCHIATRY)

MAY 2018

CERTIFICATE

This is certified that the Dissertation entitled " **STUDY ON PREVALENCE OF SLEEP DISORDERS AMONG UNDERGRADUATE MEDICAL STUDENTS IN TEACHING INSTITUTION"** is a bonafide record work done by **Dr.S.MINATHUL MUFITHA** in the department of psychiatry, Thanjavur Medical College, Thanjavur, during his Post Graduate Course, under my direct supervision and guidance. This is submitted as partial fulfilment for the requirement of M.D**., Degree Examination - Branch XVIII (Psychiatry)** to be held in May 2018 under **The Tamil Nadu Dr. M.G.R. Medical University.**

Professor & Head
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Thanjavur.

The Dean,
Thanjavur Medical College,
Thanjavur.

DECLARATION

I, **Dr. MINATHUL MUFITHA.S,** solemnly declare that the dissertation titled **"STUDY ON PREVALENCE OF SLEEP DISORDERS AMONG UNDERGRADUATE MEDICAL STUDENTS IN TEACHING INSTITUTION"** has been prepared by me. I also declare that this bonafide work or a part of this work was not submitted by me or any other for any award, degree, diploma to any other University board either in India or abroad.

This is submitted to The Tamil Nadu Dr. M. G. R. Medical University, Chennai, in partial fulfilment of the rules and regulation for the award of M.D degree Branch – XVIII (Psychiatry) to be held in MAY- 2018.

Place: Thanjavur (Dr. MINATHUL MUFITHA.S)

Date:

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Dept. of PSYCHIATRY **Thanjavur Medical College, Thanjavur**

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Dated : 01.03.2017

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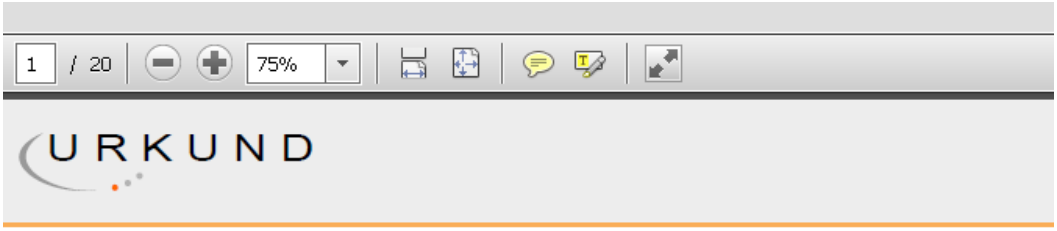

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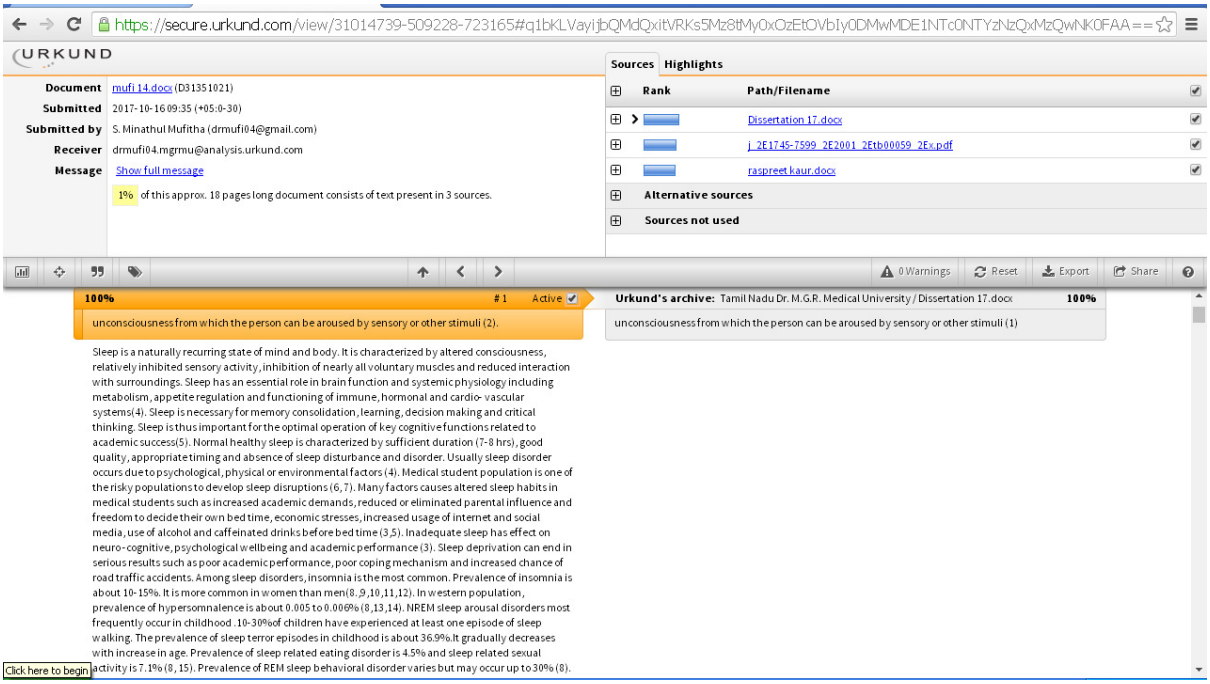
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Sleep is a naturally recurring state of mind and body. It is characterized by altered consciousness, relatively inhibited sensory activity, inhibition of nearly all voluntary muscles and reduced interaction with surroundings. Sleep has an essential role in brain function and systemic physiology including metabolism, appetite regulation and functioning of immune, hormonal and cardio- vascular systems(4). Sleep is necessary for memory consolidation, learning, decision making and critical thinking. Sleep is thus important for the optimal operation of key cognitive functions related to academic success(5). Normal healthy sleep is characterized by sufficient duration (7-8 hrs), good quality, appropriate timing and absence of sleep disturbance and disorder. Usually sleep disorder occurs due to psychological, physical or environmental factors (4). Medical student population is one of the risky populations to develop sleep disruptions (6, 7). Many factors causes altered sleep habits in medical students such as increased academic demands, reduced or eliminated parental influence and freedom to decide their own bed time, economic stresses, increased usage of internet and social media, use of alcohol and caffeinated drinks before bed time (3,5). Inadequate sleep has effect on neuro-cognitive, psychological wellbeing and academic performance (3). Sleep deprivation can end in serious results such as poor academic performance, poor coping mechanism and increased chance of road traffic accidents. Among sleep disorders, insomnia is the most common. Prevalence of insomnia is about 10-15%. It is more common in women than men(8 ,9 ,10 ,11 ,12). In western population, prevalence of hypersomnalence is about 0.005 to 0.006% (8 ,13 ,14). NREM sleep arousal disorders most frequently occur in childhood . 10-30%of children have experienced at least one episode of sleep walking. The prevalence of sleep terror episodes in childhood is about 36.9%.It gradually decreases with increase in age. Prevalence of sleep related eating disorder is 4.5% and sleep related sexual activity is 7.1% (8, 15). Prevalence of REM sleep behavioral disorder varies but may occur up to 30% (8).
Click here to begin

LIST OF ABBREVIATIONS

PSQI	-	Pittsburgh Sleep Quality Index
ESS	-	Epworth Sleepiness Scale
PSS	-	Perceived Stress Scale
EEG	-	Electro-Encephalography
EMG	-	ElectroMyography
EOG	-	ElectroOculography
SWS	-	Slow Wave Sleep
N-REM	-	Non-Rapid Eye Movement
REM	-	Rapid Eye Movement

CONTENTS

INTRODUCTION

Sleep is an essential behavior of all animal species [1]. Adequate amount and good quality of sleep are fundamental to both physical and mental wellbeing. It is influenced by various biological and environmental factors. We are aware of many different states of brain activity such as sleep, wakefulness and extreme excitement [3].

Sleep is defined as unconsciousness from which the person can be aroused by sensory or other stimuli [2]. Sleep is a naturally recurring state of mind and body. It is characterized by altered consciousness, relatively inhibited sensory activity, inhibition of nearly all voluntary muscles and reduced interaction with surroundings.

Sleep has an essential role in brain function and systemic physiology including metabolism, appetite regulation and functioning of immune, hormonal and cardio- vascular systems[4].

Sleep is necessary for memory consolidation, learning, decision making and critical thinking. Sleep is thus important for the optimal operation of key cognitive functions related to academic success[5].

Normal healthy sleep is characterized by sufficient duration (7-8 hrs), good quality, appropriate timing and absence of sleep disturbance and disorder.

Usually sleep disorder occurs due to psychological, physical or environmental factors [4].

Medical student population is one of the risky populations to develop sleep disruptions [6, 7]. Many factors causes altered sleep habits in medical students such as increased academic demands, reduced or eliminated parental influence and freedom to decide their own bed time, economic stresses, increased usage of internet and social media, use of alcohol and caffeinated drinks before bed time [3,5].

Inadequate sleep has effect on neuro -cognitive, psychological wellbeing and academic performance [3]. Sleep deprivation can end in serious results such as poor academic performance, poor coping mechanism and increased chance of road traffic accidents.

Among sleep disorders, insomnia is the most common. Prevalence of insomnia is about 10-15%. It is more common in women than men[8.,9,10,11,12]. In western population, prevalence of hypersomnalence is about 0.005 to 0.006% [8,13,14].

NREM sleep arousal disorders most frequently occur in childhood .10-30%of children have experienced at least one episode of sleep walking. The prevalence of sleep terror episodes in childhood is about 36.9%.It gradually decreases with increase in age.

Prevalence of sleep related eating disorder is 4.5% and sleep related sexual activity is 7.1% [8, 15]. Prevalence of REM sleep behavioral disorder varies but may occur up to 30% [8].

Insomnia was mostly presented as secondary symptoms due to some other underlying medical, neurological or psychiatric disorder except in case of primary insomnia. Disturbance of initiation and maintenance of sleep is the most common form, when insomnia is co-morbid with psychiatric illness.35% of patients with insomnia symptoms are affected by mental disorders and half of these patients had mood disorders [1].

This study is focused on assessing the prevalence of sleep disorders among undergraduate medical students in Government Thanjavur Medical College.

By implementing this study, the sleep pattern of medical students and their stress level can be assessed and students who have abnormalities in this assessment can be referred for expert management.

Students also get the awareness about the abnormalities in sleeping patterns which will help them in dealing such cases in their future medical practice.

REVIEW OF LITERATURE

Sleep occupies about one-third of human life and significantly affects other two-third of life [16]. Sleep disruptions leads to cognitive, emotional and physical impairment [1]. Understanding sleep medicine is important for all medical practioners [16].

History of Sleep Medicine

Sleep Medicine has greatly developed in last four decades. There have been many discoveries that lead to investigation of sleep. Previously it was believed that sleep is the time of inactivity and tranquillity, during which the body and mind ease to recover from the day's activity.

In the early period of 19th century, major sleep theory was about hypnotoxins. This theory postulated that when we were active, there was an accumulation of hypnotoxins which produces sleepiness. Hypnotoxins got detoxified only during sleep [17].

In 1928, electro encephalography was discovered by Hans Berger .It is used to demonstrate the brain activity that occurs throughout the sleep. By using EEG and electro-oculography, rapid eye movement of sleep was discovered by Kleitman and Aserinsky in 1951.In 1957, ultradian rhythm of sleep was demonstrated by Kleitman and William Dement.

Ultrdian rhythm is characterized by alternative pattern of NREM and REM sleep [16].

Normal Sleep:

Sleep is the state of decreased perception of environmental stimuli which is distinguished from state such as coma by its relatively rapid reversibility. EEG and physiological recordings during sleep revealed two distinct states of sleep.

1. Rapid Eye Movement (REM) Sleep

2. Non REM (NREM) sleep

REM sleep is also called as paradoxical sleep because the EEG during the sleep is identical to that of waking.

NREM sleep or orthodox sleep is characterized by reduced activation of EEG. In infants REM and NREM sleep, is called as active sleep and quiet sleep respectively [1].

STAGES OF SLEEP

NREM SLEEP: For clinical and research application, sleep is typically measured in epochs of 30 seconds. The stages of sleep monitored by visual scoring of three parameters: EEG, EOG and EMG.

NREM Sleep is subdivided into three stages (N1 to N3 Stages).

In N1 stage, EEG shows loss of alpha activity and appearance of low voltage, mixed frequency with prominent theta activity. EOG shows slowness of eye movements.EMG shows slightly decreased tonic activity from wakefulness.

After a few minutes of sleep, N1 progresses to stage N2 which shows appearance of k- complexes (negative sharp wave followed by positive slow wave) and sleep spindles. Again, N2 stage is followed by N3. N3 is also called as slow wave sleep, delta sleep or deep sleep.

REM sleep:

REM sleep consists of two components: Tonic (persistent) and phasic (episodic) components. Tonic aspects of REM sleep exhibit increased activity in theta band, and generalised decrease in tone of skeletal muscles, except extra ocular muscles and diaphragm. Saw tooth waves are also present. Phasic features of REM sleep shows irregular bursts of rapid eye movements and muscle twitches [(1).]

Functions of sleep

Sleep is universal to all animal species. Sleep deprivation causes increased sleep pressure that manifested as sleepiness, which become

irresistible. Sleep pressure leads to micro sleep that cause cognitive impairment. If sleep is prevented for long period, fatality occurs.

Sleep is especially important for many physiological functions. Molecular or chemical pathway in brain will be restored during sleep, which is depleted during waking. Sleep may favour the replenishment of glycogen in glial cells, restoration of calcium in pre-synaptic stores, replenishment of glutamate vesicles, resting of mitochondria (or) transfer of proteins along axons and dendrites [17].

The sleep facilitates synaptic plasticity and promotes procedural learning processes. It facilitates the consolidation of declarative memories embedded in networks of previously existing associative memories and is important for processing emotional memories [18].

Effects of age on sleep

Development of EEG pattern of sleep and wakefulness starts at 24 weeks of gestation and differentiation of REM and NREM sleep occurs at last trimester.

Newborn infants have 16 to 18 hours of sleep per day. Active sleep is predominant in newborn. At 4 months of age, sleep EEG shows mature waveforms, characteristic of REM and NREM sleep.

As age advances, REM sleep decreases. Young children have high percentage of slow wave sleep. Due to that, there is difficulty in arousing them, and high incidence of bedwetting and slow wave sleep – related parasomnias occurs.

During adolescence, sleep time decreases significantly. This is probably due to behavioural changes rather than true decrease in sleep need. Older adults have increased incidence of primary sleep disorders and sleep disorder secondary to medical illness and psychiatric disorder. In old age, sleep become fragmented, increased latency, increased number of arousals and increased napping [(1).]

Physiology in sleep

During sleep, changes in autonomic nervous system and neuro-endocrine system occur. In autonomic nervous system, increased parasympathetic activity occurs during NREM and REM tonic sleep. During phasic REM sleep, high degree of autonomic instability occurs due to brief surges of sympathetic and parasympathetic activity.

In cardiovascular system, Blood pressure, heart rate and cardiac output decrease during NREM sleep. Increased prevalence of arrhythmias occurs during REM sleep which leads to increased rate of cardiovascular mortality in early morning, the time of greatest REM sleep propensity.

In pulmonary system, During REM sleep respiratory rate and minute ventilation decreases as a result of muscle relaxation. This changes causes exacerbation of underlying pulmonary diseases as well as sleep related breathing disorders.

Neuro-endocrine changes in sleep:

Growth hormone and prolactin secretion occurs during early part of night. But thyroid stimulating hormone secretes prior to sleep onset. Its secretion is inhibited by sleep. ACTH and cortical secretion increase at the end of sleep. Severe sleep disruption may cause significant neuro-endocrine changes [(1).]

Monitoring Human Sleep:

Sleep- wakefulness alteration is monitored by EEG, EMG and EOG. EEG is recorded by placing electrodes over scalp overlying specific regions of the brain according to international 10-20 system of electrode placement. EEG is mainly recorded in three specific regions (frontal, central & occipital). K-Complexes and slow waves are recorded with frontal electrodes. Electrodes placed over central region showed sleep spindles. Alpha activity is detected by electrode in occipital region. In special situation such as sleep related seizure disorder, additional electrodes are applied to obtain higher spatial resolution of EEG activity.

The EOG recording is used to detect rapid eye movement associated with wakefulness and REM sleep. The EMG recording used to detect tonic and phasic changes in muscle activity that correlate with changes in behavioural state.

Depending on the presenting symptoms, clinical monitoring may also include additional monitoring such as respiratory effort, flow sensors, electrocardiogram, oxyhemoglobin saturation and limb electromyogram recording [(1).]

Healthy amount of sleep:

Average quality of sleep is prerequisite for normal functioning of human mind and body. Average sleep duration in adult may vary from 7 to 8 hours. (Sahraian et al 2010).

The amount and timing of sleep and sleep architecture (sleep stages) are determined by several factors such as environmental factors, circadian rhythm and time awake (Ferrara et al 2001).

Adult should sleep 7 or more hours per night on regular basis to promote optimal health. Sleeping less than 7 hours per night for long period that leads to adverse health outcomes such as weight gain & obesity, diabetes & hypertension, heart disease & stroke, depression and increased risk of death. Sleep less than 7 hours per night is usually associated with impaired immune

function, increased pain, impaired performance, increased errors and greater risk of accidents.

Sleeping more than 9 hours per night on regular basis may appropriate for young adults, individuals recovering from sleep debt and individual with illness. Individual's variability in sleep need is influenced by genetic, behavioural, medical and environmental factors. (Nathaniael F Watson et al 2005).

Sleep deprivation:

Daytime sleepiness, sleep deprivation and irregular sleep schedules are highly seen among college students, as 50% report daytime sleepiness and 70% attain insufficient sleep. Mostly college students are sleep deprived, as 70.6% of students report obtaining less than 8 hours of sleep. (Shelley D Hershner et al).

Adolescents are physiologically predisposed to develop chronic sleep deprivation because of maturation changes of the circadian and homeostatic regulation of sleep wake cycles leading to delay in the timing of sleep with consequent accumulation of chronic debt. (Giannotti et al 2002).

There is no single cause for sleep deprivation. If a person has sleep disorder, it is very likely that individual has decreased sleep. For this issue, we have to diagnose the disorder from which the person suffers. The sleep disorder that individual can suffer which prevent them to achieve adequate amount of sleep. (Murphy & Delanty et al 2007).

Sleep deprivation in students occurs due to schedule set by colleges & schools with class time being set early in the morning and late in the evening as well as workloads of class room, individual circadian rhythm causing them to have decreased sleep.(Herschner& Chervin et al 2014).

College students prone for sleep deprivation:

Sleep problems more commonly occurs in college students because students have increased chance of getting decreased amount of sleep. Sleep deprivation occurs due to their poor sleep behaviour i.e. they go to bed late and wake up early.

Many students do not maintain proper sleep hygiene, in conjunction with delayed circadian rhythm leading to sleep deprivation. (Stepanski et al 2003).11.6% of students who used alcohol as sleep aid. Alcohol decreases sleep latency but increases fragmented sleep in the latter half of the night.(Taylor DJ et al 2010).

Caffeine usage improves the ability to sustain wakefulness and decreases sleepiness. 34% of young people consumed energy drinks regularly. (O Brien Mc et al 2008).Use of prescribed (or) non- prescribed stimulants is increased among young individuals. A survey at 119 colleges and universities in US reported that 6.9% life time prevalence for use of stimulants.(Mc Cabe St et al 2005).Due to their high academic demands , most medical students have

habitual to study for long hours in night , excessive internet use and use of stimulants to stay awake. (Mume Co et al 2011).

A study conducted in Lebanon University students concluded that 90% students were going to bed late. There are significant differences between good sleeper & poor sleeper such as sleep characteristics like total sleep hours sleep latency and sleep efficiency. (Suen Lk et al 2008).

Health consequences of sleep deprivation:

Sleepiness and irregular sleep schedules have many consequences, which lead to negative impact on learning, memory, driving performance, grades, perception of effort and mood.

Students with sleep disorder will not able to achieve optimal academic performance and up to 27% of students may develop sleep disorder. (Gaultney JF et al 2010).

A higher percentage of students at risk for academic failure evaluated for other sleep disorders including; periodic limb movements disorder/ restless leg syndrome (21%), insomnia (22%), circadian rhythm sleeps disorders (26%) and hypersomnia (21%). (Gaultney JF et al 2010).

The prevalence of DSPD (delayed sleep – phase disorder) in the US college population is about 6.7% - 17%. DSPD, a circadian rhythm disorder

characterised by sleep onset insomnia and difficulty waking at desired time. (Trockel M et al 2011)

One of the important consequences of sleep deprivation is drowsy driving. In 2011, sleep in America poll, 66% of young adults reported drowsy during driving. (Sleep foundation 2011)

Irregular sleep schedules are strongly correlated with greater depressive symptoms. Prolonged sleep latency was associated with loss of pleasure, punishment feelings and self – dislike. (Brooks Pr et al 2009)

Insomnia may be causative factor for suicidal ideation, suicide attempts and death. A study on college students without sleepiness or depression found that sleep extension significantly improved scores on the profile of mood states. (Kamdar Bb et al 2004)

Excessive daytime sleepiness is more prevalence in female students than male and female are more prone to develop sleep disorders. (Alotair et al 2008)

Students have many challenging facets in their lives such as exams, work, family, relationship and classes. Sleep is normally not the focus of health related behaviour but in spite of that reduced amount of sleep often leads to stress. About 30% of students are sleep deprived. 54% of students reported that sleep

deprivation causes their learning and working problems. (Schneider K et al 2009)

Predictor of academic success is high-school education and self-efficacy. Self efficacy is one's belief in one's ability to succeed in specific situations or accomplish a task. Self referred cognitions influence thinking, feeling, motivation and behaviour in significant way. Student's belief in their self efficacy plays an important role in academic demands and their own competence. A German study showed that self efficacy was lower in students suffering from insomnia. (Bouchard S et al 2003)

Sleepiness and altered sleep pattern can affect the cognitive and psychomotor performance which is important for medical students who are responsible for life of patients. (Marzieh Nojomi et al)

Medical students who have sleep deprivation run a major risk of creating medical errors than who have an adequate amount of rest.

One study showed that one third of medical students have fair sleep. This study revealed the association between self perception of sleep satisfaction and insomnia. Those with poor (or) very poor sleep consume sleeping pills more than others. (Viedl M et al 2005)

Stress in medical students:

Medical school is recognized as a stressful environment that often causes negative effect on physical and psychological well being. Medical students are expected to learn a huge amount of knowledge and skills. They have to make it in order to maintain good academic results in a highly competitive environment under a lot of pressure. (Wolf TM et al 1984)

Perceived stress and somatic complaints has to be increased during exam periods and leads to sleep problems. Poor sleep is related with low academic performance. (Zunhammer M et al)

This stress has serious results which may lead to the development of anxiety and depression. (Ko SM et al 1999)

A study among UG students in USA found that 23% had clinical depression and 57% were under psychological stress. (Mosley TH Jr et al1994)

Medical students experienced the stress from the beginning of training process. Although some degree of stress is accepted as normal part of medical training, not all students could manage stress. Stress may exert feelings of fear, incompetence, uselessness anger and guilt and has been associated with both psychological and physical disorders. (Abdhul ghani HM et al 2011 & Alfrair et al 2014)

Medical students used to deal with stress by various coping mechanisms. Coping strategies determine whether stress has a positive or negative influence. Appropriate strategies such as problem solving, positive interpretation & social support can enable students to respond in a manner that leads to adaptation.

Ineffective stress coping mechanism such as problem avoidance, social withdrawal & self criticism leads to negative consequences such as depression, anxiety and poor mental health. (Dyrebye LM et al 2005)

Stress leads to other illness such as heart attack, migraine, psoriasis, rheumatoid arthritis, ulcers, angina, asthma, cancer, cystitis, diabetes, and diarrhoea. Sometimes, partial or total loss of hair occurs due to stress. (Behere SP et al 2011)

Stress during medical school can cause problem later in professional life compromising patient care. (Jadoon NA et al 2010)

Important causes of depression among medical students are dissecting cadavers, pathologic processes, fear of acquiring diseases, feeling of inadequacy in medical hierarchies etc. (Dyrebye et al 2006)

Continuous exposure to stress among medical students lead to changes in their daily habits such as lack of sleep, irregular diet and substance abuse in the form of excessive consumption of alcohol and smoking in order to cope up with academic burden and demands. (Sahrain et al 2010, Tamaki et al 2010)

ICD-10 CLASSIFICATION AND DIAGNOSTIC CRITERIA OF SLEEP DISORDERS

F51 NONORGANIC SLEEP DISORDERS

F51.0 NON ORGANIC INSOMNIA

Insomnia is a condition of unsatisfactory quantity and /or quality of sleep, which persists for a considerable period of time. Among insomniacs difficulty falling asleep is the most prevalent complaint, followed by difficulty staying asleep and early final awakening.

Clinical features that are essential for a definitive diagnosis:

1. The complaint is either of difficulty falling asleep or maintaining sleep, or of poor sleep quality.

2. The sleep disturbance has occurred at least three times per week for at least one month.

3. There is preoccupation with the sleeplessness and excessive concern over its consequences at night and during the day.

4. The unsatisfactory quantity and/or quality of sleep either causes marked distress or interferes with ordinary activities in daily living.

F51.1 NONORGANIC HYPERSOMNIA

Hypersomnia is defined as a condition of either excessive daytime sleepiness or sleep attacks (not accounted by an inadequate amount of sleep) or prolonged to the fully aroused state upon awakening.

Clinical features that are essential for a definitive diagnosis:

1. Excessive day time sleepiness and sleep attacks (not accounted by an inadequate amount of sleep) or prolonged to the fully aroused state upon awakening.
2. Sleep disturbance occurring daily for more than one month or for recurrent periods of shorter duration, causing either marked distress or interference with ordinary activities in daily living.
3. Absence of auxiliary symptoms of narcolepsy (cataplexy, sleep paralysis, hypnogogic hallucinations) or of clinical evidence of sleep apnoea (nocturnal breath cessation, typical intermittent snorting sounds etc)
4. Absence of any neurological or medical condition of which day time somnolence maybe symptomatic.

F51.2 NONORGANIC DISORDER OF THE SLEEP-WAKE SCHEDULE

A disorder of the sleep wake schedule is defined as the lack of synchrony between the individuals sleep wake schedule and the desired sleep wake schedule for the environment, resulting in a complaint of either insomnia or hypersomnia. This disorder maybe either psychogenic or of presumed organic

origin, depending on the relative contribution of psychological or organic factors.

Clinical features that are essential for definitive diagnosis:

1. The individuals sleep wake pattern is out of synchrony with the sleep wake schedule that is normal for a particular society and shared by most people in the same cultural environment.
2. Insomnia during the major sleep period and hypersomnia during the waking period are experienced nearly every day for at least one month or recurrently for shorter periods of time.
3. The unsatisfactory quantity, quality and timing of sleep cause marked distress or interfere with ordinary activities in daily living.

F51.3 SLEEP WALKING (SOMNABULISM)

Sleep walking or somnambulism is the state of altered consciousness in which phenomena of sleep and wakefulness are combined. During a sleep walking episode the individual arises from bed, usually during the first third of nocturnal sleep, and walks about, exhibiting low level of awareness, reactivity and motor skill.

Clinical features that are essential for definitive diagnosis:

1. The predominant symptom is one or more episodes of rising from bed, usually during the first third of the nocturnal sleep, and walking about.
2. During an episode the individual has a blank, staring face, he is relatively unresponsive to the efforts of others and can be awakened only with considerable difficulty.
3. Upon awakening (either from an episode or the next morning), the individual has no recollection of the episode.
4. Within several minutes of awakening from the episode, there is no impairment of mental activity or behavior, although there may initially be a short period of confusion and disorientation.
5. There is no evidence of organic mental disorder such as dementia or a physical disorder such as epilepsy.

F51.4 SLEEP TERRORS (NIGHT TERRORS)

Sleep terrors or night terrors are nocturnal episodes of extreme terror and panic associated with intense vocalization, motility and high levels of autonomic discharge. The individual sits up or gets up with the panicky scream, usually during the first third of the nocturnal sleep, often rushing to the door as if trying to escape, although he or she very seldom leaves the room.

Clinical features that are essential for definitive diagnosis:

1. The predominant symptom is that one or more episodes of awakening from sleep begin with the panicky scream, and or characterized by intense anxiety, body motility and autonomic hyperactivity.
2. These repeated episodes typically last one to ten minutes and usually occur during the first third of nocturnal sleep.
3. There is relative unresponsiveness to efforts of others to influence the sleep terror event and such efforts are almost invariably followed atleast several minutes of disorientation and perseverative movements.
4. Recall of the event, if any, is minimal (usually limited to one or two fragmentary mental images)
5. There is no evidence of a physical disorder, such as brain tumour or epilepsy.

F51.5 NIGHTMARES

Nightmares are dream experiences loaded with anxiety or fear, of which the individual has very detailed recall. The dream experiences are extremely vivid and usually include themes involving threats to survival, security, or self esteem.

Clinical features that are essential for definitive diagnosis:

1. Awakening from nocturnal sleep or naps with detailed and vivid recall of intensely frightening dreams, usually involving threats to survival, security or self esteem; the awakening may occur at any time during the sleep period, but typically during the second half.
2. Upon awakening from the frightening dreams the individual rapidly becomes oriented and alert.
3. The dream experiences itself, and the resulting disturbance of sleep, cause distress to the individual.

F51.8 OTHER NONORGANIC SLEEP DISORDERS.

F51.9 NONORGANIC SLEEP DISORDER, UNSPECIFIED.

AIM AND OBJECTIVES

1. To assess the prevalence of sleep disorders among under graduate medical students.

2. To analyse the socio demographic variables, academic performances and psychological stress and its correlation with sleep disorders.

MATERIALS AND METHODOLOGY

This study was conducted among undergraduate medical students in Thanjavur Medical College.

Period of study:

The study period was from Jan' 2017 to Jun' 2017.

Study design:

Cross-sectional study.

Inclusion criteria:

1. Male and Female medical students who are studying in clinical years.
2. Students fulfilling the age criteria of 18 to 23 years.
3. Students who gave consent to participate in the study.

Exclusion criteria:

- Students using psychoactive substance in any form.
- Students who was not attending clinical years.

Tools Used:

- Semi structured socio-demographic proforma
- Pittsburgh sleep quality index
- Epworth sleepiness scale
- Perceived stress scale

The students were selected by random sampling method. In random sampling method, each member of the study group will get an equal chance to get selected for the study. A random sampling is done here that every student is chosen by chance without any bias. The aim and objectives of the study is explained and the importance of such studies was also explained to them so that they actively participate.

The importance of the truth and validity of their responses to the scales given to them were also stressed and they were assured that their identity will be confidential. They were also informed that the study will be performed only after their consent and not otherwise. The therapeutic guidance for the participants who scored significant scores was assured.

First, informed consent was obtained and the students were instructed to put signature from the information sheet which assured the confidentiality of the results.

The semi structured socio-demographic proforma was given to them to fill in the details.

Pittsburgh Quality Sleep Index:

Pittsburgh Quality Sleep Index is a 19 item self rated questionnaire for evaluating subjective sleep quality over the previous month. The 19 questions are combined into 7 clinically derived component scores, each weighted quality from 0-3. The components of PSQI are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications and daytime dysfunction. The 7 component scores are added to obtain a global score ranging from 0-21, with higher score indicating worse sleep quality. These numerical scores provide the clinician with an efficient overall summary of patient's quality of sleep and sleep health. (Buysse DJ et al)

PSQI was developed with several goals:

1. To provide a reliable, valid and standardized measure of sleep quality.
2. To discriminate between good and poor sleepers.
3. To provide an index that is easy for subjects to use and for clinicians and researchers to interpret.
4. To provide a brief, clinically useful assessment of a variety of sleep disturbances that affect sleep quality.

The Pittsburgh Sleep Quality Index has a sensitivity of 89.6% and specificity of 86.5%. (Daniel J Buysse et al) PSQI instrument assesses global measures of sleep disturbance by sum of scores of sub components. In current

study, global score of PSQI equal to or more than 5 considered as having poor quality of sleep.

In this study, insomnia was assessed by using three categories: (i) insufficient sleep less than 7 hours (ii) inability to sleep within in 30 minutes (3 or more times per week) (iii) frequent awakenings at night (3 or more times per week). To determine the presence of insomnia, PSQI questions were used. Students who answered 3 or more times per week to the sub components no. 2&5 were considered as suffering from insomnia.

Epworth sleepiness scale:

Epworth sleepiness scale is a self administered questionnaire. It used to assess the person's general level of day time sleepiness. It was developed by Dr Murray Johns in 1991.

It is used to measure and quantify sleep propensity rather than fatigue, as manifested by the tendency to fall asleep in various conditions. The sleepiness during daytime is assessed in various eight conditions.

Scores are distributed as: No chance of dozing – 1, Slight chance of dozing – 2, Moderate chance of dozing -3, High chance of dozing- 4.

The higher the score, the sleepier the patient, generally the scores up to 0-7 considered normal, 8-9 average amount of daytime sleepiness, equal to or greater than 10 abnormal daytime sleepiness. The scores of the scale shown to be consistently higher in condition associated with day time somnolence such as

sleep apnoea, narcolepsy and idiopathic hypersomnalence. In this study, ESS score $\geq$ 10 considered as having excessive daytime sleepiness.

Perceived Stress Scale:

Perceived Stress Scale is a ten item likert type self rated questionnaire. PSS-10 questionnaire is a reliable and valid assessment instrument for measuring the perception of stress. PSS-10 had demonstrated good internal (intra-observer) reliability with Cronbach's alphas ranging from 0.78 to 0.91 and test-retest reliability co-efficient ranging from 0.55 to 0.85. (Cohens et al 1983)

The score ranges from 0-40. The answers are graded on a 5-point likert scale ranging from never = 0, almost never = 1, sometimes =2, fairly often = 3, to very often =4. Positively framed questions 4, 5, 7 and 8 are reverse scored, that is never = 4 to very often = 0, and scores are summed, with higher score indicating more perceived stress. The maximum score of PSS is 40 and the higher scores indicate higher level of stress. Stress level classified into 3 categories: 0-13 = low stress, 14-26= moderate stress and 27-40= high stress. In this study, PSS scores more than 13, considered as having stress in students.

RESULTS

The total number of students participated in the study was 300. All of them were explained about the scales and what is the inference of each scale. Out of 300 students, 31 students excluded from the study due to substance use. Then 269 data profile were used for this study.

TABLE .1 GENDER DISTRIBUTIONS OF STUDY SAMPLES:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Male	117	43.5
Female	152	56.5

This table shows that male students contribute 43.5% and female students contribute 56.5%.

FIGURE - 1: SEX DISTRIBUTION

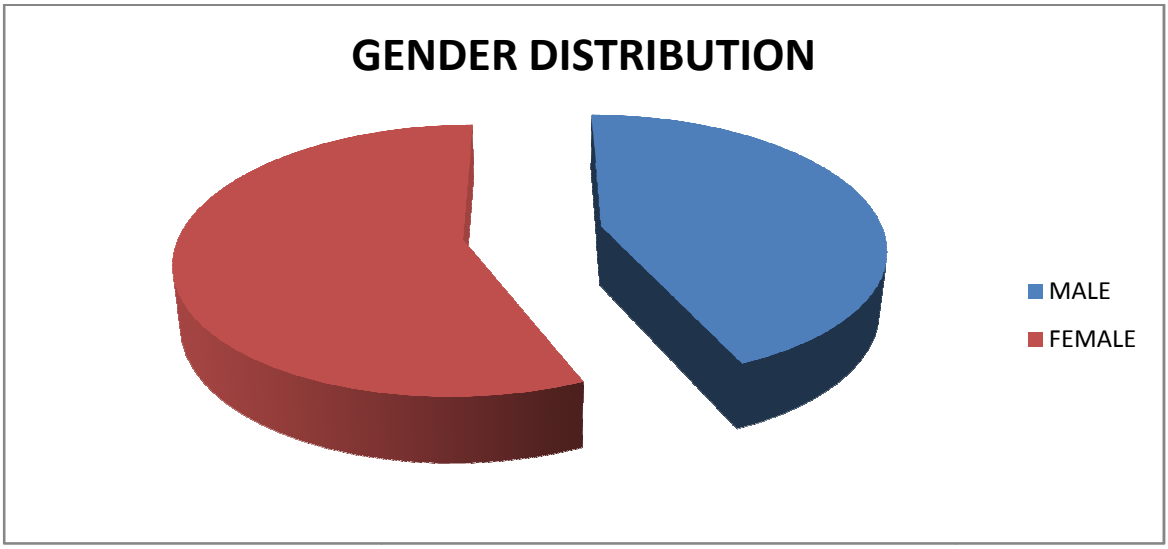


FIGURE -1: Shows the gender distribution among the study population.

TABLE.2. NATIVITY OF STUDENTS:

Particulars	**No.of respondents (n=269)**	**Percentage (100%)**
Urban	135	50.2
Rural	134	49.8

Table 2 : shows that 50.2% were urban and 49.8% were rural.

TABLE.3. ACADEMIC YEAR OF MEDICAL STUDENTS:

Particulars	**No.of respondents (n=269)**	**Percentage (100%)**
Second year	61	22.7
Third year	103	38.3
Final year	105	39.0

Table -3: shows among 269 medical students 22% belongs to second year, 38.3% belongs to third year and remaining 39% in final year.

TABLE.4. FAMILY INCOME OF STUDENTS:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
<20,000	73	27.1
20,000-40,000	73	27.1
40,000-60,000	57	21.2
>60,000	66	24.5

The above table shows that among 269 respondents 146(54.2%) students belong to < 40,000 per month family income, 21.2% belong to 40,000 -60,000 and remaining 24.5% belong to >60,000 per month family income.

TABLE.5 FAMILY HISTORY OF PYSCHIATRIC ILLNESS:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	5	1.9
No	264	98.1

The above table shows among 269 respondents 98.1% of students does not have family history of psychiatric illness and 1.9% had family history of psychiatric illness.

TABLE. 6. PAST HISTORY OF PSYCHIATRIC ILLNESS:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	2	0.7
No	267	99.3

The above table shows that majority of students 267(99.3%) does not have past history of psychiatric illness and 2(0.7%) had past history of psychiatric illness.

TABLE.7. HISTORY OF PHYSICAL ILLNESS:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	9	3.3
No	260	96.7

The above table shows that majority of students 260(96.7%) does not have medical co-morbidity and 9(3.3%) students had history of medical illness.

TABLE.8. STUDENTS RESIDING AT HOSTEL:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	245	91.1
No	24	8.9

This table shows that most of the medical students 245(91.1%) resided at hostel and 24 (8.9%) students at home.

TABLE.9. ACADEMIC PERFORMANCE:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Poor	18	6.7
Fair	96	35.7
Good	120	44.6
Excellent	35	13.0

This table shows that majority of academic performance of the 120(44.6%) students were found to be good.

TABLE 10: POOR SLEEP QUALITY:

particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	82	30.5
No	187	69.5

The above table shows a sample of 269 medical students, 30.5% (82) students had poor quality of sleep.

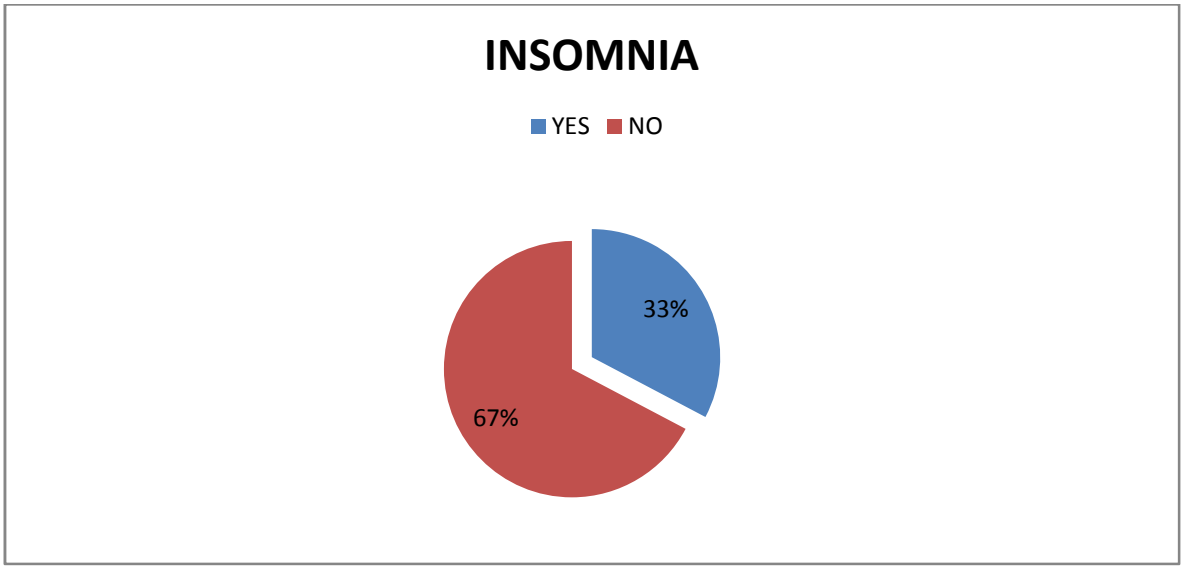
FIGURE 2 : POOR SLEEP QUALITY AMONG SAMPLE

TABLE. 11. INSOMNIA

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	88	32.7
No	181	67.3

The above table shows among 269 respondents majority of the students(181) had normal sleep and remaining (88) had insomnia.

FIGURE 3: DISTRIBUTION OF INSOMNIA AMONG STUDENTS



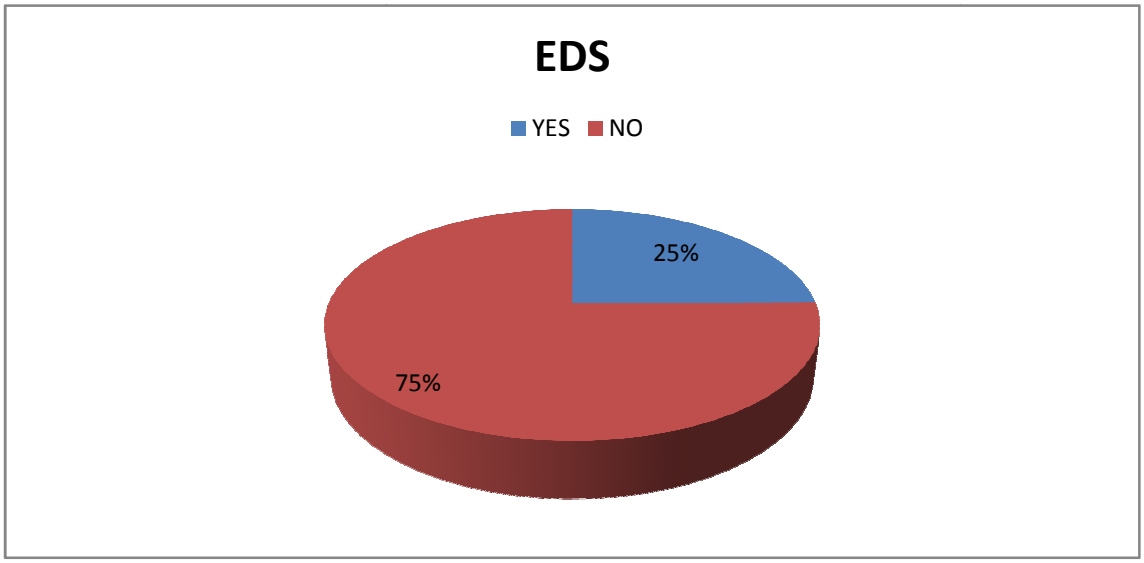
The above figure shows among 269 respondents majority of the students (67.3%) had normal sleep and remaining (32.7%) had insomnia.

TABLE 12.EXCESSIVE DAYTIME SLEEPINESS

Particulars	**No.of respondents (n=269)**	**Percentage (100%)**
Yes	67	24.9
No	202	75.1

The above table reveals 24.9% have excessive daytime sleepiness as compare with other respondents.

FIGURE 4: EXCESSIVE DAYTIME SLEEPINESS AMONG STUDENTS



The above figure reveals 24.9% have excessive daytime sleepiness as compare with other respondents.

TABLE. 13. STRESS AMONG STUDENTS:

Particulars	**No. of respondents (n=269)**	**Percentage (100%)**
Yes	174	64.7%
No	95	35.3%

Table shows among the 269 respondents majority of the students (64.7%) had stress.

FIGURE: 5 STRESS AMONG STUDENTS

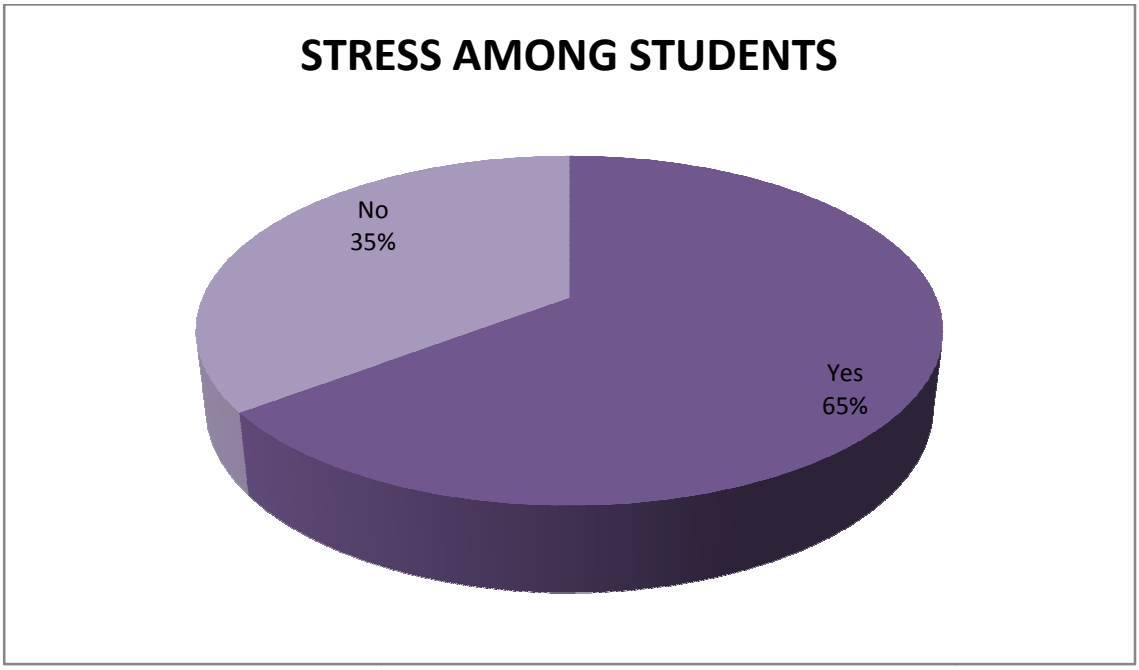


TABLE.14.1 GENDER DISTRIBUTION AMONG THE SAMPLE POPULATION WITH POOR SLEEP QUALITY

Poor sleep quality	YES		NO		TOTAL		STATISTICAL INFERENCE
MALE	38	46.3%	79	42.2%	117	43.5%	X^2=.389Df=1
FEMALE	44	53.7%	108	57.8%	152	56.5%	.533>0.05 Not Significant

Table above show among 269 respondents, 82 students had poor quality of sleep . Majority of them were female(44) students. The result found statistically not significant.

TABLE.14.2: GENDER DISTRIBUTION AMONG THE SAMPLE POPULATION WITH EXCESSIVE DAY TIME SLEEPINESS.

EXCESSIVE DAYTIME SLEEPINESS	YES		NO		TOTAL		STATISTICAL INFERENCE
MALE	29	43.3%	88	43.6%	117	43.5%	X^2=.002Df=1 .968>0.05 not significant
FEMALE	38	56.7%	114	56.4%	152	56.5%	

The table above shows gender distribution among the sample population with excessive day time sleepiness. Majority of them were female(38) students. The result found no statistical significance.

TABLE.14.3 GENDER DISTRIBUTION AMONG THE SAMPLE POPULATION WITH INSOMINA

INSOMNIA	YES		NO		TOTAL		STATISTICAL INFERENCE
MALE	40	45.5%	77	42.5%	117	43.5%	X^2=.204Df=1 .651>0.05 not significant
FEMALE	48	54.5%	104	57.5%	152	56.5%	

In gender distribution prevalence of sleep disorders more common among female than males, The result found were not statistically significant.

TABLE.15.1 NATIVITY DISTRIBUTION AMONG THE SAMPLE POPULATION WITH POOR SLEEP QUALITY

POOR SLEEP QUALITY	YES		NO		TOTAL		STATISTICAL INFERENCE
URBAN	37	45.1%	98	52.4%	135	50.2%	X^2=1.210Df=1 .271>0.05 not significant
RURAL	45	54.9%	89	47.6%	134	49.8%	

The table above shows nativity distribution among the sample population with poor sleep quality. Majority of them were from the rural area(45 students). The result found was not statistically significance.

TABLE.15.2 NATIVITIY DISTRIBUTION AMONG THE SAMPLE POPULATION WITH EXCESSIVE DAY TIME SLEEPINESS.

EXCESSIVE DAY TIME SLEEPINESS	YES		NO		TOTAL		STATISTICAL INFERENCE
URBAN	39	58.2%	96	47.5%	135	50.2%	X^2=2.297Df=1 .130>0.05 not significant
RURAL	28	41.8%	106	52.5%	134	49.8%	

The table above shows nativity distribution among the sample population with excessive daytime sleepiness. Majority of them were from urban area (39) students. The result found no statistical significance.

TABLE.15.3: NATIVITY DISTRIBUTION AMONG THE SAMPLE POPULATION WITH INSOMINA

INSOMNIA	YES		NO		TOTAL		STATISTICAL INFERENCE
URBAN	48	54.5%	87	48.1%	135	50.2%	X^2.994Df=1 .319>0.05 not significant
RURAL	40	45.5%	94	51.9%	134	49.8%	

As far as nativity is concerned, urban constitute 50.2%, and rural constitute 49.8% in this sample. When compared among nativity, prevalence of insomnia and day time sleepiness is found to be more among urban than rural. But statistical inference is not significant.

TABLE.16.1 ACADEMIC YEAR OF MEDICAL STUDENTS AND POOR SLEEP QUALITY :

POOR SLEEP QUALITY	YES		NO		TOTAL		STATISTICAL INFERENCE
II YEAR	13	15.9%	48	25.7%	61	22.7%	X^2=4.043 Df=2 .132>0.05 not significant
III YEAR	31	37.8%	72	38.5%	103	38.3%	
FINAL YEAR	38	46.3%	67	35.8%	105	39.0%	

Table above shows Academic year of medical students and poor quality of sleep majority of them were final years (46.3%). The result found no statistical significance

TABLE.16.2 ACADEMIC YEAR OF MEDICAL STUDENTS AND EXCESSIVE DAY TIME SLEEPINESS :

EXCESSIVE DAYTIME SLEEPINESS	YES		NO		TOTAL		STATISTICAL INFERENCE
II YEAR	3	4.5%	58	28.7%	61	22.7%	X^2=17.148Df=2 .000<0.05 significant
III YEAR	30	44.8%	73	36.1%	103	38.3%	
FINAL YEAR	34	50.7%	71	35.1%	105	39.0%	

Table above shows Academic year of medical students and excessive daytime sleepiness. Majority of them were final years (50.7%). The result found statistical significance(p=0.000)

Figure: 6: ACADEMIC YEAR OF MEDICAL STUDENTS AND EXCESSIVE DAY TIME SLEEPINESS

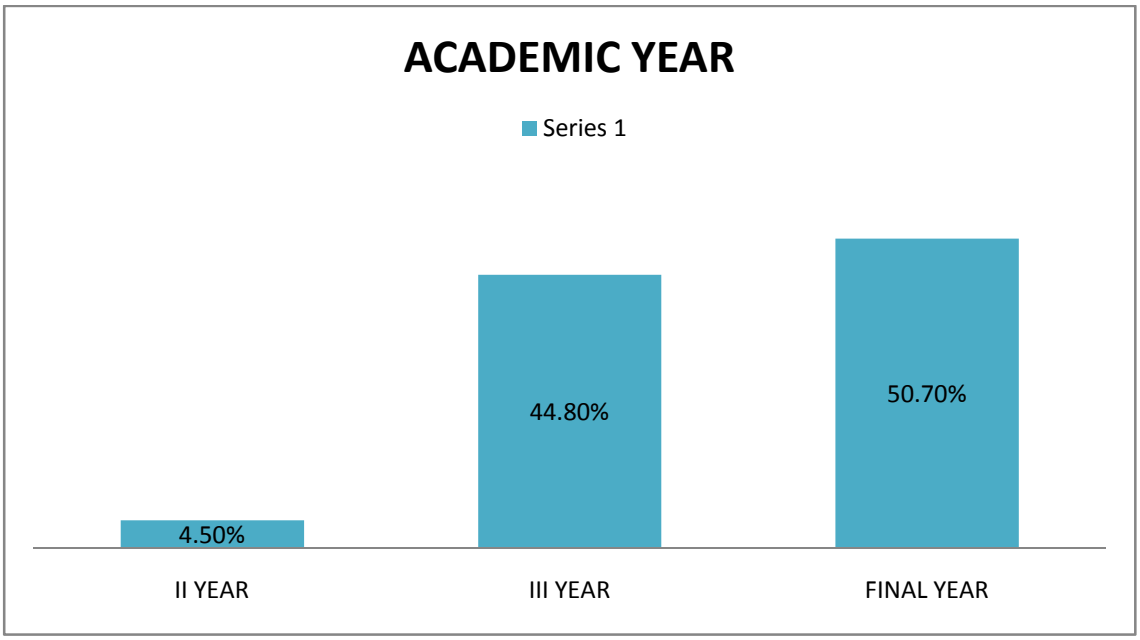


TABLE.16.3 ACADEMIC YEAR OF MEDICAL STUDENTS AND INSOMIOA:

INSOMNIA	YES		NO		TOTAL		STATISTICAL INFERENCE
II YEAR	12	13.6%	49	27.1%	61	22.7%	X^2=27.453Df=2 .000<0.05 significant
III YEAR	22	25.0%	81	44.8%	103	38.3%	
FINAL YEAR	54	61.4%	51	28.2%	105	39.0%	

Table above shows Regarding academic year, prevalence of sleep disorder is higher among final year students followed by pre-final students and by second year students. The difference is statistically significant in insomnia and excessive daytime sleepiness, but not in poor sleep quality. The result found statistically significant.(P=0.000)

TABLE.17.1 FAMILY INCOME AND POOR SLEEP QUALITY

POOR SLEEP QUALITY	YES		NO		TOTAL		STATISTICAL INFERENCE
<20,000	21	25.6%	52	27.8%	73	27.1%	X^2=7.3334Df=3 .062>0.05 not significant
20,000-40,000	28	34.1%	45	24.1%	73	27.1%	
40,000-60,000	10	12.2%	47	25.1%	57	21.2%	
>60,000	23	28.0%	43	23.0%	66	24.5%	

Table above shows family income and poor sleep quality . Majority of them belong the income group of 20,000- 40,000 per month(34.1%)

TABLE.17.2 FAMILY INCOME AND EXCESSIVE DAY TIME SLEEPINESS

EXCESSIVE DAY TIME SLEEPINESS	YES		NO		TOTAL		STATISTICAL INFERENCE
<20,000	18	26.9%	55	27.2%	73	27.1%	X^2=3.370Df=3 .338>0.05 not significant
20,000-40,000	23	34.3%	50	24.8%	73	27.1%	
40,000-60,000	10	14.9%	47	23.3%	57	21.2%	
>60,000	16	23.9%	50	24.8%	66	24.5%	

Table above shows family income and excessive day time sleepiness. Majority of students belong to 20,000-40,000 group(34.3%). The result found no significance.

TABLE.17.3 : FAMILY INCOME AND INSOMNIA

INSOMNIA	YES		NO		TOTAL		STATISTICAL INFERENCE
<20,000	23	26.1%	50	27.6%	73	27.1%	X^2=3.613Df=3 .306>0.05 not significant
20,000-40,000	30	34.1%	43	23.8%	73	27.1%	
40,000-60,000	15	17.0%	42	23.2%	57	21.2%	
>60,000	20	22.7%	46	25.4%	66	24.5%	

On comparing the sleep disturbances between the family income of the students, it is more prevalent in students whose family income <40,000 but no statistical significance.

TABLE.18.1 FAMILY H/O MENTAL ILLNESS:

Family h/o Psychiatric illness	Poor sleep quality				TOTAL		STATISTICAL INFERENCE
	Yes		No				
Yes	1	1.2%	4	2.1%	5	1.9%	X^2=.264Df=1 .607>0.05 not significant
No	81	98.8%	183	97.9%	264	98.1%	

The table above shows family history of psychiatric illness and poor sleep quality. Majority of them had no psychiatric illness in there family. The result found no statistically significance.

TABLE.18.2 : FAMILY HISTORY OF PSYCHIATRIC ILLNESS AND EXCESSIVE DAYTIME SLEEPINESS.

Family H/O psychiatric illness	EXCESSIVE DAYTIME SLEEPINESS				TOTAL		STATISTICAL INFERENCE
	Yes		No				
YES	0	0%	5	2.5%	5	1.9%	X^2=1.690Df=1 .194>0.05 not significant
NO	67	100%	197	97.5%	264	98.1%	

Table above shows the family history of psychiatric illness and excessive daytime sleepiness. The results found no statistically significance.

TABLE.18.3 FAMILY HISTORY OF PSYCHIATRIC ILLNESS AND INSOMNIA.

Family history of psychiatric illness.	INSOMNIA				TOTAL		STATISTICAL INFERENCE
	Yes		No				
YES	1	1.1%	4	2.2%	5	1.9%	X^2=.374Df=1 .541>0.05 not significant
NO	87	98.9%	177	97.8%	264	98.1%	

On analyzing family history of psychiatric illness among medical students ,Majority of the students have negative family history . The result found no statistical significant.

TABLE.19.1 PAST H/O PSYCHIATRIC ILLNESS AND POOR SLEEP QUALITY

PAST H/O PSYCHIATRIC ILLNESS	POOR SLEEP QUALITY				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	0	0%	2	1.1%	2	.7%	X^2=.884Df=1 .347>0.05 not significant
NO	82	100%	185	98.9%	267	99.3%	

The table above shows past history of psychiatric illness and poor sleep quality. Most of students had negative history of psychiatric illness. The results shows no statistical significance.

TABLE.19.2: PAST HISTORY OF PSYCHIATRIC ILLNESS AND EXCESSIVE DAYTIME SLEEPINESS

PAST H/O OF PSYCHIATRIC ILLNESS	EXCESSIVE DAYTIME SLEEPINESS				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	1	1.5%	1	.5%	2	.7%	X^2=.884Df=1 .347>0.05 not significant
NO	66	98.5%	201	99.5%	267	99.3%	

Table above shows past history of psychiatric illness and excessive daytime sleepiness. Majority of them does not have past history of psychiatric illness(98.5%). The result found no significance.

TABLE.19.3: PAST HISTORY OF PSYCHIATRIC ILLNESS AND INSOMNIA

PAST HISTORY OF PSYCHIATRIC ILLNESS	INSOMNIA				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	0	0%	2	1.1%	2	.7%	X^2=.980Df=1 .322>0.05 not significant
NO	88	100%	179	98.9%	267	99.3%	

The Table above shows majority of them without the past history of psychiatric illness (100%). The result found no significance.

TABLE.20.1 PAST HISTORY OF PHYSICAL ILLNESS AND POOR SLEEP QUALITY

Past history physical illness	POOR SLEEP QUALITY				TOTAL		STATISTICAL INFERENCE
	Yes		No				
YES	0	0%	9	4.8%	9	3.3%	X^2=4.083Df=1 .043<0.05 significant
NO	82	100%	178	95.2%	260	96.7%	

Table above shows past history of physical illness and poor quality of sleep. The result found statistically significance.(p=0.043).

TABLE.20.2 PAST HISTORY OF PHYSICAL ILLNESS AND EXCESSIVE DAYTIME SLEEPINESS

PAST H/O PHYSICAL ILLNESS	EXCESSIVE DAYTIME SLEEPINESS				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	0	0%	9	4.5%	9	3.3%	X^2=3.088Df=1 .079>0.05 not significant
NO	67	100%	193	95.5%	260	96.7%	

The table above shows past history of physical illness and excessive daytime sleepiness. Majority of the students (100%) has negative history. The results shows no statistical significance.

TABLE.20.3 PAST HISTORY OF PHYSICAL ILLNESS AND INSOMNIA

PAST H/O PHYSICAL ILLNESS	INSOMNIA				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	0	0%	9	5.0%	9	3.3%	X^2=4.527Df=1 .033<0.05 significant
NO	88	100%	172	95%	260	96.7%	

The table above shows past history of physical illness insomnia. Most of the students give negative response. Result shows statistical significance. (p value = .033)

TABLE.21.1 STUDENTS RESIDING IN HOSTEL AND POOR SLEEP QUALITY:

RESIDING IN HOSTEL	POOR SLEEP QUALITY				TOTAL		STATISTICAL INFERENCE
YES	82	100%	163	87.2%	245	91.1%	X^2=4.083Df=1 .043<0.05 significant
NO	0	0%	24	12.8%	24	8.9%	

The table above shows students residing in hostel and poor sleep quality. Most of the students (100%) stayed in hostel. The results show statistical significance. (p value = .043)

TABLE.21.2 STUDENTS RESIDING IN HOSTEL AND EXCESSIVE DAYTIME SLEEPINESS:

STUDENTS RESIDING IN HOSTEL	EXCESSIVE DAYTIME SLEEPINESS				TOTAL		STATISTICAL INFERENCE
YES	67	100%	178	88.1%	245	91.1%	X^2=8.740Df=1 .003<0.05 significant
NO	0	0%	24	11.9%	24	8.9%	

The table above shows students residing in hostel and excessive daytime sleepiness. Majority of the students have positive response. The results show statistical significance.(p value = .003)

TABLE.21.3 STUDENTS RESIDING IN HOSTEL AND INSOMNIA:

STUDENTS RESIDING IN HOSTEL	INSOMNIA				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	88	100%	157	86.7%	245	91.1%	X^2=12.812Df=1 .000<0.05 significant
NO	0	0%	24	13.3%	24	8.9%	

The table above shows students residing in hostel and insomnia. The result shows statistical significance with sleep disorders. (P value= .000)

TABLE.22.1.ACADEMIC PERFORMANCE AND POOR SLEEP QUALITY:

ACADEMIC PERFORMANCE	POOR SLEEP QUALITY				TOTAL		STATISTICAL INFERENCE
	YES		NO				
POOR	9	11.0%	9	4.8%	18	6.7%	X^2=16.130Df=3
FAIR	40	48.8%	56	29.9%	96	35.7%	.001<0.05
GOOD	28	34.1%	92	49.2%	120	44.6%	significant
EXCELLENT	5	6.1%	30	16%	35	13.0%	

The table above shows academic performance and poor sleep quality. Most of the students (48.8%) scored fair academic performance. The result shows statistical significance. (P value = .001)

FIGURE 7 .ACADEMIC PERFORMANCE AND POOR SLEEP QUALITY:

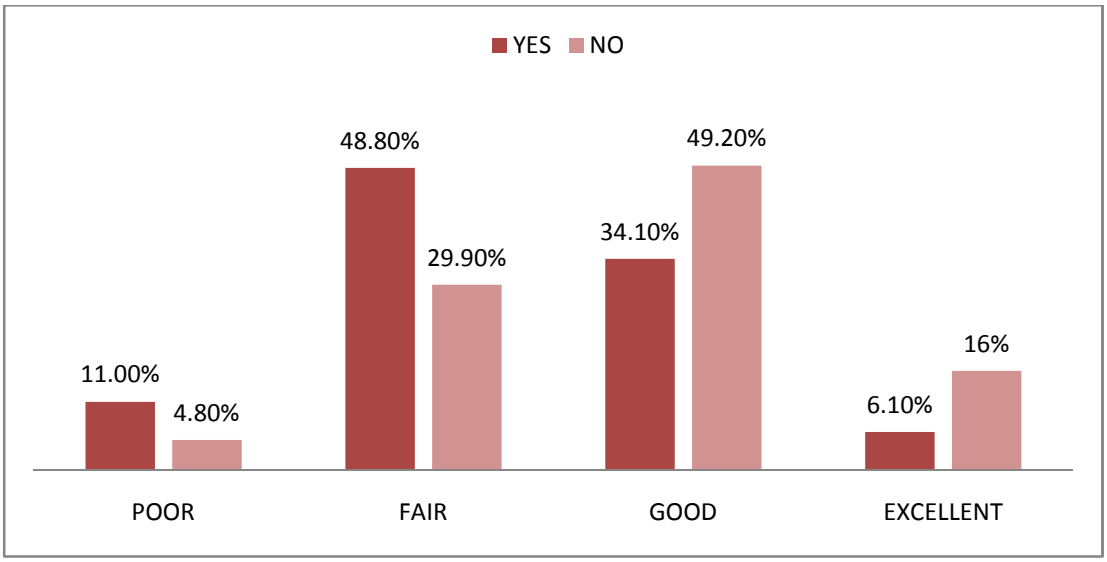


TABLE.22.2 ACADEMIC PERFORMANCE AND EXCESSIVE DAYTIME SLEEPINESS:

ACADEMIC PERFORMANCE	EXCESSIVE DAYTIME SLEEPINESS				TOTAL		STATISTICAL INFERENCE
	YES		NO				
POOR	4	6.0%	14	6.9%	18	6.7%	X^2=2.164Df= 3
FAIR	28	41.8%	68	33.7%	96	35.7%	.539>0.05
GOOD	29	43.3%	91	45.0%	120	44.6%	Not significant
EXCELLENT	6	9.0%	29	14.4%	35	13.0%	

This above table shows academic performance and excessive daytime sleepiness. Majority of academic performance found to be good. The result shows no statistical significance.

TABLE.22.3 ACADEMIC PERFORMANCE AND INSOMNIA:

ACADEMIC PERFORMANCE	INSOMNIA				TOTAL		STATISTICAL INFERENCE
	YES		NO				
POOR	7	8.0%	11	6.1%	18	6.7%	X^2=15.401Df=3
FAIR	40	45.5%	56	30.9%	96	35.7%	.002<0.05
GOOD	39	44.3%	81	44.8%	120	44.6%	significant
EXCELLENT	2	2.3%	33	18.2%	35	13.0%	

This table shows academic performance and insomnia. Majority of students scored fair academic performance. The result shows statistical significance. (P value=.002)

TABLE.23.1STRESS AND POOR SLEEP QUALITY:

STRESS	POOR SLEEP QUALITY				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	62	75.6%	112	59.9%	174	64.7%	X^2=6.164Df=1
NO	20	24.4%	75	40.1%	95	35.3%	.013<0.05
							significant

This above table shows stress and poor sleep quality. Majority of the students (75.6%) with sleep problems had stress. The result shows statistical significance. (P value = .013)

TABLE.23.2STRESS AND EXCESSIVE DAYTIME SLEEPINESS

STRESS	EXCESSIVE DAYTIME SLEEPINESS				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	56	83.6%	118	58.4%	174	64.7%	X^2=13.949Df=1 .000<0.05 significant
NO	11	16.4%	84	41.6%	95	35.3%	

This above table shows stress and excessive daytime sleepiness. Most of the students (83.6%) had stress. The result shows statistical significance. (P value= .000)

TABLE.23.3STRESS AND INSOMNIA:

STRSS	INSOMNIA				TOTAL		STATISTICAL INFERENCE
	YES		NO				
YES	68	77.3%	106	58.6%	174	64.7%	X^2=9.073Df=1 .003<0.05 significant
NO	20	22.7%	75	41.4%	95	35.3%	

This above table shows stress and insomnia. Majority of the students(68) who suffered from insomnia had stress. The result shows statistical significance. (P value = .003)

DISCUSSION

This study was conducted among the undergraduate medical students studying in Thanjavur Medical College. The students were approached after getting their informed consent. The selection was based on random sampling method. A semi structured proforma was used to assess the socio-demographic data of the students.

The following scales were applied to the students.

1. Pittsburgh sleep quality index.
2. Perceived stress scale.
3. Epworth sleepiness scale.

The prevalence of poor sleep quality is about 30.5%. It was assessed by using PSQI global scores in which scores equal to or greater than five. Out of 269 students, 82 students had poor sleep quality. In this study, poor sleep quality had a positive correlation with academic performance and stress.

When poor sleep quality is compared with another study which was conducted in Saudi Arabia showed 30% of the students had poor sleep quality. (Mohamed A Alsaggaf et al)

A cross-sectional study which conducted in Palestinian students in 2009 assessed the sleep habits and sleep problems. 400 students participated in the

study. It reported only 9% of students had poor sleep quality which was very low when compared to this study. (Waleed M Sweileh et al 2009)

Another study conducted in private and public universities of Lebanon in which 540 students were participated. 58.7% of students had poor sleep quality which was assessed by using PSQI global score. (Colette S Kabrila et al) A study conducted in Qazyin Medical University of Iran in which 57.5% of students had poor sleep quality. (Zuhreh Yazdi et al 2015) Both study results which was higher when compared to this study.

A study was conducted on 263 students at king saud bin abdulaziz University of Health sciences, Saudi Arabia. 76% of students had poor quality of sleep which was very high. (Abdullah I. Almojali et al)

The variation between results from different studies may be related to difference in cultural habits, socio-economic status and university characteristics of different countries.

The prevalence of excessive day time sleepiness in this study is about 24.9%. Out of 269 students who scored equal or more than 10 in poor sleepiness scale had excessive day time sleepiness. In this study excessive day time

sleepiness had a association with stress and academic year but not with academic performance.

A study of 320 medical students in Saudi Arabia showed that 40% of the students had excessive day time sleepiness and it was significantly associated with stress (Mohamed A Alsaggaf et al)

A cross-sectional study was conducted in 900 students of King Saud University, Saudi Arabia. The results showed that 36.6% of students had excessive day time sleepiness. (Hamza M Abdulghani et al 2012)

Another study conducted among 364 student pharmacists showed 47.8% felt day time sleepiness almost every day. (Megan L Zeek et al 2014)

Prevalence of insomnia is about 32.7% in the study. The students who had insufficient sleep less than 7 hours or inability to sleep within 30 minutes (3 or more time per week) or frequent awakening at night (3 or more times per week) considered as having insomnia. Insomnia had a strong positive correlation with academic performance and stress.

A study conducted in Saudi Arabia which showed insomnia symptoms in 33% of students which was similar to the current study. (Mohamed A Alsaggaf)

Nadoff et al reported prevalence of 13.1% insomnia symptoms among US college students in west Virginia. This results was less when compared with this study.

Another study conducted in medical students of brazil showed 28.1% of students suffered from insomnia.(loayza et al)Another cross-sectional study conducted among medical students in bengaluru which showed prevalence of insomnia was 39.4%.(Roshin jose et al 2016)The prevalence of insomnia in delhi medical students was about 30.3% (sachdeva et al 2015).

A cross-sectional study was conducted with 388 students at Debre berhan university, Ethiopia. Nearly 3 out of 5 students (i.e.) 61.6% had insomnia. There was no significant association between insomnia and academic performance. It showed high prevalence than this study. It might be due to difference in study population, age, educational level and cultural differences..(Yohannes et al 2017)

In this study, female students suffered from sleep disorders higher than male students.

A study conducted in medical university of Iran showed that means insomnia score was higher among women than men. It has been showed that sleep disturbances are greater among women.(Marziech nojomi et al 2009)

Another study in Koblenz leendau university of Germany showed that all sleep difficulties were more common among females than males , which corresponds with results of this study. This provided evidence that sleep problems was more prevalent among women even in younger adult population. (Angelika A Schlarb et al 2012

In this study, 64.7% of students had stress which was assessed by using perceived stress scale. Students who scored more than 13 considered as having stress. Studies done in other countries and in other states of India had reported higher prevalence of stress among undergraduate medical students. A study from Saudi Arabia reported 57%. (Abdhulghani HM et al 2008)

Survey conducted by saipanish reported that 61.4% of students in Thai medical school had come across some degree of stress during their training period.(saiphanish R et al 2003)

Another study done in Pakistan reported 85% of students felt stressed one or other time during study period. A study done in Mumbai reported 73% of students perceived stress at some point or other during medical schooling. other two studies from Pakistan found more than 90% of students experienced stress during their course .(shaik BT et al 2004 & Inam SNB 2003 et al)

The amount and severity of stress experienced by medical students may vary according to the settings of medical school, the curricula and evaluation system .

In this study, there is no positive correlation of sleep disturbances with gender, nativity, family income of the students, family history of psychiatric illness and past history of physical illness of the students.

CONCLUSION

The following results can be brought out by this descriptive cross-sectional study to assess the prevalence of sleep disorder in undergraduate medical students.

1. The study was carried out by applying Pittsburgh sleep quality index, Epworth sleepiness scale and perceived stress scale.
2. A semi-structured proforma was given to them to assess their year of study, presence or absence of physical illness, family income and presence or absence of them staying away from home.
3. The prevalence of poor sleep quality in medical undergraduates observed in this study is 30.5%.
4. The prevalence of excessive daytime sleepiness is 24.9%.
5. The prevalence of insomnia in medical undergraduates is about 32.7%.
6. The prevalence of sleep disorder shows statistical significance with stress and academic performance

The importance of acquiring sufficient and good quality of sleep for medical student is essential as they play role in patient's well being and outcomes, as well as their career success. Interventions may focus on the

following areas: making students aware of the consequences of their poor sleep habit on their academic performance and providing students with alternative skills to handle academic burden such as time management skill and maintaining good class attendance.

In addition, the intervention may promote good sleep hygiene so as to reduce the effect of behavioral factors on individual sleep.

LIMITATIONS

1. In this study, relationship of sleep disturbances with stress and academic performance was totally based on students response in the questionnaire, which would affect the results.

2. The study was conducted among limited number of students. So findings cannot be generalised.

3. This is cross-sectional study which was conducted at single point of time. Further longitudinal studies give the better results.

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SOCIO-DEMOGRAPHIC PROFILE

AGE :

SEX :

NATIVITY : RURAL / URBAN

ACADEMIC YEAR :

FAMILY INCOME(per month) : < 20000 / 20,000-40,000/ 40,000- 60,000/ >60,000

OCCUPATION OF THE PARENT :

FATHER:

MOTHER:

FAMILY HISTORY OF MENTAL ILLNESS : YES / NO

HISTORY OF PSYCHIATRIC ILLNESS IN THE PAST : YES/ NO

HISTORY OF PHYSICAL ILLNESS : YES /NO IF SPECIFY :

STAYING AWAY FROM HOME :YES / NO

ANY SUBSTANCE USE : YES /NO SPECIFY :ALCOHOL /OTHERS

ACADEMIC PERFORMANCE : POOR/ FAIR /GOOD/ EXCELLENT

The Epworth Sleepiness Scale

The Epworth Sleepiness Scale is widely used in the field of sleep medicine as a subjective measure of a patient's sleepiness. The test is a list of eight situations in which you rate your tendency to become sleepy on a scale of 0, no chance of dozing, to 3, high chance of dozing. When you finish the test, add up the values of your responses. Your total score is based on a scale of 0 to 24. The scale estimates whether you are experiencing excessive sleepiness that possibly requires medical attention.

How Sleepy Are You?
How likely are you to doze off or fall asleep in the following situations? You should rate your chances of dozing off, not just feeling tired. Even if you have not done some of these things recently try to determine how they would have affected you. For each situation, decide whether or not you would have:

- No chance of dozing =0
- Slight chance of dozing =1
- Moderate chance of dozing =2
- High chance of dozing =3

Write down the number corresponding to your choice in the right hand column. Total your score below.

Situation	Chance of Dozing
Sitting and reading	•
Watching TV	•
Sitting inactive in a public place (e.g., a theater or a meeting)	•
As a passenger in a car for an hour without a break	•
Lying down to rest in the afternoon when circumstances permit	•
Sitting and talking to someone	•
Sitting quietly after a lunch without alcohol	•
In a car, while stopped for a few minutes in traffic	•

Total Score = _____

Analyze Your Score

Interpretation:

0-7: It is unlikely that you are abnormally sleepy.
8-9: You have an average amount of daytime sleepiness.
10-15: You may be excessively sleepy depending on the situation. You may want to consider seeking medical attention.
16-24: You are excessively sleepy and should consider seeking medical attention.

Reference: Johns MW. A new method for measuring daytime sleepiness: The Epworth Sleepiness Scale. *Sleep* 1991; 14(6):540-5.

Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts **during the last month**. In each case, you will be asked to indicate by circling *how often* you felt or thought a certain way.

0 = Never 1 = Almost Never 2 = Sometimes 3 = Fairly Often 4 = Very Often

1. In the last month, how often have you been upset because of something that happened unexpectedly?	0	1	2	3	4
2. In the last month, how often have you felt that you were unable to control the important things in your life?	0	1	2	3	4
3. In the last month, how often have you felt nervous and "stressed"?	0	1	2	3	4
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	0	1	2	3	4
5. In the last month, how often have you felt that things were going your way?	0	1	2	3	4
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	0	1	2	3	4
7. In the last month, how often have you been able to control irritations in your life?	0	1	2	3	4
8. In the last month, how often have you felt that you were on top of things?	0	1	2	3	4
9. In the last month, how often have you been angered because of things that were outside of your control?	0	1	2	3	4
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	0	1	2	3	4

Scoring

Perceived Stress Scale scores are obtained by reversing responses (e.g., 0 = 4, 1 = 3, 2 = 2, 3 = 1 & 4 = 0) to the four positively stated items (items 4, 5, 7, & 8) and then summing across all scale items.

1. _____
2. _____
3. _____
4. _____ (RS)
5. _____ (RS)
6. _____
7. _____ (RS)
8. _____ (RS)
9. _____
10. _____

Total Score: _____

Interpretation

Higher Perceived Stress Scale Scores are associated with higher levels of stress and indicate a greater likelihood for stress interfering with things like lifestyle changes (a person's efforts to quit smoking) and their ability to improve their shape. Higher scores are associated with an increase in a person's vulnerability to compromised health, especially if a big life stress (loss of a job, end of a relationship, death of a loved one, etc.) occurs in the near future. Higher scores are also associated with increased susceptibility to stress-induced illness.

Total Score	Your Perceived Stress Level is:	Health Concern Level
0-7	Much Lower than Average	Very Low
8-11	Slightly Lower than Average	Low
12-15	Average	Average
16-20	Slightly Higher than Average	High
21 and over	Much Higher than Average	Very High

S/No	Age	Sex	Serving STN	Academic Year	Family HOME/STN	Has HC Physical Illness Y/N	HO Physical Illness Y/N	Sought Help from Home STN	Attended Professional	Time to Get Bed	Time to Fall Asleep (min)	Time to Wake up	Hours of Sleep/Night (Hr)	1 night sleep quality	2 sleep latency	3 sleep duration	4 habitual sleep efficiency	5 sleep disturbances	6 use of sleep med	7 sleep dysfunction	PSQI Total	POOR SLEEP QUALITY Y/N	INSOMNIA Y/N	PSS TOTAL	STRESS	ISS TOTAL	ESCAPE/AVOIDANCE SLEEPWEAR
1	37	1	1	3	2	2	2	2	3	25:30	20	5:30	6.5	1	3	1	0	1	0	1	7	2	1	19	1	4	2
2	33	2	1	3	2	2	2	2	3	25:00	10	7:30	9	0	1	0	0	1	0	1	4	2	1	9	1	6	2
3	31	2	1	3	2	2	2	2	3	8:00	10	7:30	8.5	0	1	0	0	1	0	1	4	2	1	25	1	5	2
4	23	1	1	3	2	2	2	2	4	23:00	15	6:30	7	1	2	1	0	1	0	1	6	2	1	16	1	4	2
5	22	2	1	3	2	2	2	2	4	23:00	30	6:30	7	1	2	1	0	1	0	1	6	2	1	14	1	4	2
6	24	2	1	3	2	2	2	2	4	00:00	10	8:00	8	0	1	0	0	1	0	1	4	2	1	16	1	5	2
7	26	2	1	3	2	2	2	2	4	23:00	10	8:00	9	0	1	0	0	1	0	1	4	2	1	16	1	4	2
8	23	2	1	3	2	2	2	2	4	23:30	10	8:00	8	0	1	0	0	1	0	1	4	2	1	16	1	4	2
9	23	2	1	3	2	2	2	2	4	0:00	30	7:30	7.5	0	1	0	0	1	0	1	4	2	1	16	1	4	2
10	25	2	1	3	2	2	2	2	4	22:30	15	7:30	8	0	1	0	0	1	0	1	4	2	1	16	1	4	2
11	15	1	1	3	2	2	2	2	4	22:30	10	6:30	8	0	1	0	0	1	0	1	4	2	1	16	1	4	2
12	15	1	1	3	2	2	2	2	4	22:30	10	6:30	8	0	1	0	0	1	0	1	4	2	1	16	1	4	2
13	15	1	1	3	2	2	2	2	3	22:30	10	6:30	8	0	1	0	0	1	0	1	4	2	1	16	1	4	2
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176	21	2	2	2	3	2	2	2	1	2	2	23:00	20	6:00	7	1	1	1	0	1	0	1	5	1	2	10	2	9	2
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